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diiodic Acids: By J. H. KASTLE and J. H. BULLOCK. The use of naphthalene and bromine is recommended for making hydrobromic acid, and a mixture of resin, iodine and sand for hydriodic acid.

Turmerol: By C. LORING JACKSON and W. H. WARREN. Turmerol, prepared from the crude product by distilling *in vacuo*, when treated with nitric acids yields paratoluic acid. It is considered to be an alcohol containing a benzene ring with methyl and carbon side chains in the para position.

Bromine derivatives of Resorcline: By C. LORING JACKSON and F. L. DUNLAP. It is not possible to replace two of the bromine atoms in $C_6HBr_3(OC_2H_5)_2$ by hydrogen, unless the hydrogen atom is first replaced by the nitro group. The introduction of a hydroxyl group also facilitates the replacement of the bromine. The ethoxy groups do not weaken the affinity of the bromine as the free tribromoresorcline is easily decomposed.

Trinitrophenylmalonic ester: By C. LORING JACKSON and C. A. SOCH. The method of preparation, reactions and derivatives of picrylmalonic ester, which Dittrich was unable to obtain, are given in this paper.

The artificial production of Asphalt from Petroleum: By C. F. MABERY and J. H. DYERLEY. After removing the oils used for illuminating purposes, the residue is distilled slowly while air is drawn through. Products of different specific gravity are separated and used for various purposes in which asphalt has been used.

On the Action of Phosphorus Pentachloride on Parasulphaminebenzoic Acid: By IRA REMSEN, R. N. HARTMAN and A. M. MUCHENFUSS. The product formed by the action of phosphorus pentachloride on parasulphaminebenzoic acid, when heated, decomposes in two stages, and the final product contains the nitrogen group in combination with the carbon atom instead of with the sulphone group as at first. Some light is thrown on the nature of this change by these investigations.

This number also contains a review of the work on *Chemical Technology* by GROVES and THORP. Vol. II.

J. ELLIOTT GILPIN.

PSYCHE, MARCH.

THE number is mostly occupied by the Presidential address of Clarence M. Weed on the 'Hibernation of Aphides,' summarizing previous knowledge. J. W. Folsom gives an account of the oviposition of *Thanaos juvenalis*, and a supplement is occupied by descriptions of insects, mostly New Mexican, by T. D. A. Cockerell and C. F. Baker.

SOCIETIES AND ACADEMIES.

THE NEW YORK ACADEMY OF SCIENCES.

AT the meeting of the Geological Section of the New York Academy of Sciences, held on February 17, 1896, the following papers were presented:

The first paper was read by Mr. L. McI. Luqueer, entitled 'Notes on Recent Accessions of Interesting Minerals,' with exhibition of specimens. Mr. Luqueer described in detail the minerals that he had recently discovered at the feldspar quarries in the northeastern part of Westchester county. They include uraninite, autunite, uranophane, washingtonite and the common minerals of pegmatite veins. He showed that the veins occurred in close association with an area of augen-gneiss, regarded as intrusive and now being studied by himself and Mr. Heinrich Ries.

The second paper was by J. F. Kemp, entitled 'The Cripple Creek Gold Mining District of Colorado.' The paper was illustrated by about thirty lantern views, most of which were taken by the speaker during the past summer, and by an extensive series of rocks and ores. After a brief historical review the region was described in detail, without, however, introducing anything essential that is not already contained in the Cripple Creek atlas folio of the United States Geological Survey, which was prepared by Messrs. Cross and Penrose.

J. F. KEMP,
Secretary.

THE TORREY BOTANICAL CLUB.

THE regular meeting of the Torrey Botanical Club was held on Tuesday evening, February 11th. Two new members were elected. Mr. A. A. Heller contributed an interesting paper

entitled 'Botanizing in Hawaii.' Lantern views were presented illustrating the geography and topography of the islands and a number of the more interesting plants. About twenty-five per cent. of the species collected are supposed to be undescribed. The endemic character of the flora of the islands, and of each island as contrasted with the others, was dwelt upon.

Dr. Arthur Hollick, through Dr. Britton, submitted a paper on 'New Leguminous Pods from the Yellow Gravel Sandstone at Bridgeton, N. J.' The paper was illustrated by specimens belonging to the genera *Lonchocarpus* and *Mezoneurum*.

H. H. RUSBY,
Recording Secretary.

BOSTON SOCIETY OF NATURAL HISTORY.

A GENERAL meeting was held February 5th; forty-four persons present. Mr. Herbert Lyon Jones spoke of the biological adaptations of desert plants to their surroundings, mentioning first the food of plants, their adaptations for retaining moisture, and the adaptations that go to preserve the moisture. The struggle of plants in tropical regions was noted; also the struggle of desert plants against inorganic nature. The effects of the amount of rain, the variations in leaf surface, and the protections afforded to leaf and to stem were discussed. Where the rainfall is limited to a few inches the leaves are thickened and covered with a coating of wax; in some regions of considerable rainfall the plants suddenly put out delicate leaves. The Australian Acacias show the most numerous adaptations of leaf surface; in some Cacti the leaf surface is entirely wanting, the function being performed by the stems.

The protection afforded to leaf and stem by coatings of wax is always thick in desert plants, and the hairy coatings form a striking adaptation in many plants, and are best shown in the plants of the Mediterranean flora.

The fertilization of desert plants was described in detail, also the distribution of their seeds and fruits; and Mr. Jones closed with remarks explanatory of the fine series of lantern slides illustrating the biological adaptations of desert plants to their surroundings.

SAMUEL HENSHAW,
Secretary.

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA, FEBRUARY 18.

A PAPER entitled as follows was presented for publication: 'Contributions to the Life History of Plants, No. XII,' by Thomas Meehan: 1. Fecundity of *Heliophytum Indicum*; 2. Origin of the Forms of Flowers; 3. Spines in the Citrus Family; 4. Flowers and Flowering of *Lamium purpureum*; 5. Cleistogamy in *Umbelliferae*; 6. Rhythmic Growth in Plants; 7. Pellucid dots in some species of *Hypericum*; 8. Honey Glands of Flowers; 9. Varying Phyllotaxis in the Elm; 10. Special Features in a Study of *Cornus stolonifera*; 11. Folial Origin of Cauline Structures; 12. Polarity in the leaves of the Compass and other plants; 13. Hybrids in Nature; 14. Origin and Nature of Plant Glands; 15. Nutrition as affecting the Forms of Plants and their Floral Organs; 16. Some Neglected Studies.

Mr. D. S. Holman exhibited a new stage for the microscope devised for the purpose of studying large objects and widely spread preparations. It can be adapted to all instruments provided with square stages and has a motion of two inches each way.

Preparations of minerals containing diatoms in transverse section and other microscopic arrangements of diatoms prepared by Mr. John A. Schulze were exhibited by Mr. F. J. Keeley.

Prof. Edw. D. Cope described specimens of fossil reptilia from the Permian and Trias. They belonged to the order *Cotylosauria* which had been described by him in 1879, and was afterwards characterized by Seeley from African types. The order embraces the families *Elginiidæ*, *Pariasauridæ*, *Diadectidæ* and *Pariotichidæ*, the distribution and characters of which were dwelt on. New genera of *Diadectidæ* were described under the names *Bolbodon* and *Diatomodon*, the teeth of which, as well as of the other genera of the family, were illustrated. The *Platodontia* may have been derived from the *Diadectidæ*. The roof over the temporal fossa and the foramen for the temporal eye were illustrated by specimens. The molar teeth of a species of *Empedias*, the cranium of *Bolbodon tenuitectis* and the lower jaw of *Diatomodon* were exhibited. Another form described under

the name *Conodectes favosus* may belong to the *Diadectidæ*, but its relationships are at present uncertain.

EDW. J. NOLAN,
Recording Secretary.

GEOLOGICAL SOCIETY OF WASHINGTON.

AT the forty-third meeting of this Society, held at Washington, D. C., February 12, 1896, President S. F. Emmons in the chair, communications were presented as follows:

Structure of the Elk Garden Coal-Fields: By MR. J. A. TAFF. The Elk Garden coal-field comprises about one-third of the area of the Piedmont sheet (of Geol. Atlas of United States, U. S. G. S.), and extends about S. 30 W. across its center. This coal-field is limited on the east by the Allegheny front and on the west by the Backbone Mountain. The south branch of the Potomac drains the field from the Grant county line northward, while the southern part is in the basins of Red Creek and Blackwater River.

In topography as well as in structure the Allegheny front marks the dividing line between the middle or Great Valley and the western or plateau divisions of the Appalachian province. The valley country presents almost level crested mountain ridges, with smooth valleys between and the Allegheny front faces it with an escarpment 1100 to 2000 feet high. The Elk Garden coal-field here represents a part of the plateau region. It is not a smooth plain, but in its nearly flat surface points may be seen in the ridges which extend from the Allegheny front and Backbone Mountain into the Potomac Gorge. The structure of the valley region is illustrated by the topographic types, *i. e.*, sharp anticlinal folds in the mountain ridges and obtuse, wide and undulating folds in the valleys.

In the Elk Garden coal-field the topography is more diversified. Both the anticlinal and synclinal folds are occupied by valleys and the mountains are upon their borders. From the crests of Allegheny front and Backbone Mountain the dips of the conglomerate are 18° to 25°, but soon decrease and approach the Potomac valley almost horizontally, forming thus an obtuse synclinal basin. This basin rises toward the southwest and divides near the center of

the field, one division following Stony River and Red Creek valleys, while the other extends with the Potomac and passes southwest beyond Fairfax Knob. This division of the main synclinal basin is due to a high anticlinal fold which pitches downward between Canaan and Brown Mountains and is lost in undulations near the center of the field.

The structure of the Elk Garden coal-field presents the rocks most advantageously for the coal operator. The North Potomac river has severed the five productive coal seams ranging in thickness from four to fourteen feet, so that they incline downwards toward its gorge and also allow easy access for rail transportation.

The paper was illustrated by topographic and relief maps and by structure sections.

Disintegration and Decomposition of Diabase at Medford, Mass. By GEO. P. MERRILL.

Mr. Merrill described in considerable detail the chemical and physical changes which had taken place in the breaking down of the diabase at Medford, giving analyses of the fresh and decomposed rock as well as of the portions removed by solvents. The most interesting results brought out were: That the firm rock yielded up nearly 36% of its constituents to the solvent action of hydrochloric acid and sodium carbonate solutions, as against 32.3% by the residual sand; further, that in the process of degeneration some 20% of material was lost, the various constituents being removed in the following order, that which suffered most heavily being mentioned first: K_2O ; CaO ; MgO ; Fe_2O_3 ; SiO_2 ; Na_2O ; P_2O_5 ; the alumina, which served as the basis for calculation, being for the time assumed to have remained constant.

The degeneration was regarded as being mainly postglacial, and as due wholly to atmospheric agencies. Remarks were made as to the relative rapidity of degeneration in high and low latitudes, Mr. Merrill taking the ground that the apparent greater rapidity of decay in warm latitudes and in forested areas, was due to protection from erosion whereby the disintegrated material was allowed to accumulate. He, however, believed that there was a difference in kind in the degeneration in high

and low latitudes, in the former mechanical agencies prevailing, and in the latter chemical.

Notes on the Geology of the San Carlos Coal Field, Trans-Pecos, Texas. By T. WAYLAND VAUGHAN.

The author gave the results of a reconnaissance made jointly with Mr. T. W. Stanton, of the U. S. Geological Survey, during the field season of 1895. The coal field is situated in the Veija Mountains. Some general observations on the structure and topographic features of the region were made. Two detailed sections of the mountains were described. The general features of the combined sections, beginning at the top, are:

3. A massive lava-flow of quartz-pantellerite, which forms the summit of the mountains and from 400-600 feet thick.

2. A series of interbedded massive and fragmental rhyolites and conglomerates, sandstones and clays, into which a sheet of basalt has been intruded. South of Chispa this series is about fifteen hundred feet thick, but it is not so thick at San Carlos, where there is not such a variety of volcanic products.

1. Alternating beds of sands and clays—at San Carlos about fifteen hundred feet thick—and in which the coal occurs. Vertebrate fossils of Cretaceous age were found in the sandstones and clays above the coal. Below the coal a rich invertebrate fauna was collected, whose age was determined by Mr. Stanton to be Pierre (in the terminology of the Western Interior Region) or Taylor (in the terminology of the Texas Region). The age of the coal was determined to be Pierre or Taylor, as Mr. E. T. Dumble had previously shown. About seven miles southwest of Chispa a fault was described by which the Benton shales had been carried down below limestone belonging to the Fredericksburg division (of the Lower Cretaceous). The Benton shales are thinly laminated, bluish, calcareous shales, and contain *Inoceramus labiatus*, a fossil characteristic of the Benton. These shales are underlaid by a hard blue limestone, containing *Alectyonia carinata*, which is characteristic of the Washita division. The Dakota sandstone is absent. Limestone belonging to a lower horizon of the Washita division was found, beneath which was a limestone containing a

fauna characteristic of the Fredericksburg division.

Dr. E. C. E. Lord followed Mr. Vaughan's paper on the general geologic features of the region with a petrographic description of the rocks collected. The rock types were:

1. Massive rhyolite.

1a. Rhyolite breccias.

2. Quartz-pantellerite, which was described from America for the first time.

3. Basalt.

WM. F. MORSELL.

GEOLOGICAL CONFERENCE OF HARVARD

UNIVERSITY, FEBRUARY 11, 1896.

On the Geological Work of Vortices and Eddies, by T. A. JAGGAR, JR.

A vortex occurs wherever a fluid current is retarded or deflected. The properties of such movements have been worked out mathematically by Helmholtz and others; the present writer's aim is to express in simple terms the application of their results to geology, and to demonstrate it experimentally. Mention was made of the importance of vortical movement in the study of meteorology, the flight of birds, oceanic currents, dune formation, snow drift and névé sculpture; and a series of experiments was exhibited with specially devised projection apparatus. A horizontal beam of light projected to the screen through narrow glass tanks served to show Bjerknæs' beautiful experiment with vortex rings, the actual development of ripple-drift on a sandy surface in cross-section, the growth of ripplemark and some imitative beach marks. Apparatus for bending the beam upward through glass-bottomed trays showed the gradual separation of the linear sand ridges under the influence of the ripple-forming vortices in both rippledraft and ripplemark, and attention was called to the possibility of experimentally illustrating the action of coastal eddies in building cusps.

To be published in the proceedings of the Boston Society of Natural History.

T. A. JAGGAR, JR.,
Recording Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of February 17, 1896, Dr. Adolf Alt spoke of the anatomy of the eye, and by aid of the projecting microscope exhibited

a series of axial sections representing the general structure of the eye in thirty-one species of animals, comprising two crustacea, the squid, three fish, two batrachians, two reptiles, ten birds and eleven animals.

Prof. F. E. Nipher gave an account of the Geissler and Crookes tubes and the radiant phenomena exhibited by each when used in connection with a high tension electrical current of rapid alternation, and detailed the recent discoveries of Prof. Röntgen, showing that certain of the rays so generated are capable of affecting the sensitized photographic plate through objects opaque to luminous rays. Attention was also called to the experiments of Herz and Lodge with discharges of very high tension alternating currents which showed that by the latter certain invisible rays are produced, which like the Röntgen rays, are capable of passing through opaque bodies, such as pitch, but differing in their refrangibility by such media.

One person was elected to active membership.

WILLIAM TRELEASE,
Recording Secretary.

THE WOMAN'S ANTHROPOLOGICAL SOCIETY.

The Woman's Anthropological Society, which under the presidency of Miss Alice C. Fletcher, has greatly enlarged its scope and membership, held its 138th meeting February 1st. After the usual business, the session was given over to Miss A. Tolman Smith, director of the section of psychology.

The paper of the day was by Miss Theodate L. Smith, of Clark University, subject 'The Motor Element in Memory.' The paper described in detail a series of laboratory experiments made by the writer with a view to determine the quantitative value of the motor element in the total act of memory.

Discussion of the subject was deferred to a subsequent meeting, and the remaining time was given to the problem of emotional expression which has occupied the attention of the section for several months. Brief letters were read from Profs. Melville Bell and David Bell, also from the directors of dramatic expression in leading universities of this country, setting forth their views as to the relation between the psychic and the physical agitations that make

up the emotional state. The subject was illustrated from the standpoint of dramatic art by Mrs. J. M. D. Lander, who drew a most subtle and vivid picture of 'dual personality' in the consciousness of the actor.

Miss Wescott, principal of the Western High School, closed the discussion with a summary of tests of emotional disturbance applied by means of the Kymographion under the direction of Dr. Arthur MacDonald.

From a series of graphic records showing the effects of various emotional and mental states upon the breathing, two were selected as typical, one of the nervous, the other of the lymphatic temperament. It was interesting to note that, while in the latter the registration of emotional disturbance was relatively less than in the former case, yet there was the indisputable record of such disturbance in spite of the subject's unconsciousness of the effects. Two inferences seemed justified by the series of experiments: first, that one breathes less during any effort at concentration and under a depressing emotion; second, that one breathes more under the exhilarating influences of pleasure or amusement. Two questions were suggested as the practical outcome of the experiments: First, if the tendency of education is toward repression and self-control, is it not important to supplement courses of study by exercises that foster spontaneity; second, if the child actually breathes less under close application to study, to what degree is our physical culture work correcting this deficiency?

A. CARMAN,
Secretary.

NEW BOOKS.

James Clerk Maxwell and Modern Physics. R. T. GLAZEBROOK. New York, Macmillan & Co. 1896. Pp. vi+224. \$1.25.

Vegetable Culture. ALEXANDER DEAN. London and New York, Macmillan & Co. 1896. Pp. vi+132. 35 cents.

Exercises in Physical Measurement. LOUIS W. AUSTIN, CHARLES B. THWING. Boston, Allyn & Bacon. 1896. Pp. x+198. \$1.50.

The Whence and the Whither of Man. JOHN W. TYLER. New York, Charles Scribner's Sons. 1896. Pp. xv+312. \$1.75.